

I CLAIM:

1. A delivery system for a self-expanding stent, the delivery system comprising:
a catheter having a distal end, the catheter being configured to retain a self-expanding stent proximate the distal end; and
an inflatable device provided on the catheter and positioned proximate the distal end.
2. The delivery system of claim 1, wherein the catheter includes a tubular member and an outer member coaxially positioned about the tubular member, the outer member being slidable relative to the tubular member in an axial direction.
3. The delivery system of claim 2, wherein the outer member is configured to retain a self-expanding stent in a radially-compressed position and to release the self-expanding stent to a radially-expanded position.
4. The delivery system of claim 3, wherein the inflatable device is a balloon configured to selectively assist the self-expanding stent with radial expansion.
5. The delivery system of claim 3, further comprising a loading funnel, the loading funnel configured to be removably attachable to the distal end of the tubular member.
6. The delivery system of claim 5, wherein the loading funnel is configured to assist with radial compression of the self-expanding stent and advancement of the self-expanding stent within the outer member.
7. The delivery system of claim 2, further comprising a spacing jacket coaxially positioned about the tubular member and inside the outer member.

8. The delivery system of claim 2, further comprising a fluid port, the fluid port configured to receive a fluid and direct the fluid to a region between the tubular member and outer member.

9. The delivery system of claim 2, wherein the distal end of the tubular member includes a tapered tip.

10. The delivery system of claim 9, wherein the tapered tip includes a surface extending radially outward from the tubular member to form a seat to receive the outer member.

11. The delivery system of claim 2, wherein the tubular member includes a first marker band indicating a position corresponding to a proximal end of a self-expanding stent, a second marker band indicating a position corresponding to a re-constrain limit of a partially-expanded, self-expanding stent, and a third marker band indicating a position corresponding to a distal end of a self-expanding stent, the third marker band positioned nearest the distal end of the tubular member and the second marker band positioned between the first marker band and the third marker band.

12. The delivery system of claim 2, wherein the tubular member defines a first lumen and a second lumen, one of the first lumen and the second lumen configured to receive a guidewire, and the other of the first lumen and the second lumen providing a fluid passage to the inflatable device.

13. The delivery system of claim 2, wherein the distal end of the tubular member includes radiopaque marker bands proximate positions corresponding to a leading end and a trailing end of a self-expanding stent.

14. The delivery system of claim 2, further comprising a holding sleeve provided on the tubular member and configured to hold a self-expanding stent, the holding sleeve being spaced from the distal end of the catheter.

15. The delivery system of claim 1, wherein the inflatable device is a balloon.

16. In combination, a self-expanding stent and a delivery system for the self-expanding stent, the combination comprising:

a self-expanding stent;

a catheter having a distal end, the catheter being configured to retain the self-expanding stent proximate the distal end; and

an inflatable device provided on the catheter and positioned between the self-expanding stent and the distal end.

17. A method for implantation of a self-expanding stent, the method comprising:

providing a delivery system including a self-expanding stent, a catheter having a distal end and being configured to retain the self-expanding stent proximate the distal end, and an inflatable device provided on the catheter and positioned either between the self-expanding stent and the distal end or beneath a distal portion of the self-expanding stent;

delivering the delivery system to a region of a vessel to be repaired;

implanting the self-expanding stent into a wall of the vessel to be repaired; and

inflating the inflatable device to assist expansion of the self-expanding stent.

18. The method of claim 17, wherein delivering the delivery system includes:

positioning a medical guidewire;

guiding the delivery system with the guidewire to the area of the vessel to be repaired.

19. The method of claim 17, wherein delivering the delivery system includes:
positioning an endoscope;
guiding the delivery system through an endoscope to the area of the vessel to be repaired.

20. The method of claim 17, wherein providing a delivery system includes providing the catheter with a tubular member and an outer member coaxially positioned about the tubular member, the outer member being slidable relative to the tubular member in an axial direction

21. The method of claim 20, wherein implanting the self-expanding stent includes effectuating relative axial movement between the tubular member and outer member to release the stent and allow the stent to self-expand.

22. The method of claim 20, wherein providing a delivery system includes providing a holding sleeve on the tubular member spaced from the distal end of the catheter and configured to hold the self-expanding stent during delivery of the delivery system.

23. The method of claim 17, wherein inflating the inflatable device includes re-positioning the already-delivered delivery system such that the inflatable device is properly aligned with the self-expanded stent.

24. The method of claim 23, wherein re-positioning the already-delivered delivery system includes slightly retracting the delivery system from the point of implantation of the stent.

25. The method of claim 17, wherein inflating the inflatable device includes supplying fluid to the inflatable device.

26. The method of claim 25, wherein supplying fluid includes supplying air.

27. The method of claim 25, wherein supplying fluid includes supplying fluid by way of a lumen tube extending through the catheter.

28. The method of claim 17, further comprising:

deflating the inflatable device; and

withdrawing the delivery system from a patient's anatomy.